

ABSTRACT

Disclosed is a process for making thin hard pellicle for photomasks used in projection  
5 photolithography. The process can be used for making thin hard pellicles comprising a  
pellicle layer having a thickness in the range of about 5 to 120  $\mu\text{m}$  and a mount frame  
attached to the peripheral area of a surface of the pellicle layer. The pellicle layer can  
consist essentially of a material selected from silica, fluorine doped silica, aluminum  
10 doped silica, methylated silica, fluorinated and methylated silica, fluorinated aluminum  
doped silica,  $\text{CaF}_2$ ,  $\text{MgF}_2$ ,  $\text{BaF}_2$  and  $\text{SiC}$ . The mount frame is preferred to have  
substantially the same CTE of the pellicle layer to minimize stress caused by temperature  
change. The mount frame is preferred to be porous to the purging gas. The process for  
making the hard pellicle involves deposition of an intermediate layer comprising a  
hydrogenated amorphous silicon layer on a flat substrate, deposition of the pellicle layer  
15 on the intermediate layer, mounting the frame to the pellicle layer and the separation of  
the pellicle from the substrate by heat treatment.